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EXAMINER	
SHERMAN, STEPHEN G	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/733,401	NAM ET AL.	
	Examiner	Art Unit	
	STEPHEN G. SHERMAN	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8,11,13-15,19 and 21-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-8,11,13-15, 19 and 21-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 March 2009 has been entered. Claims 1, 2, 4-8, 11, 13-15, 19 and 21-25 are pending. Claims 3, 9, 10, 12, 16-18 and 20 have been cancelled.

Response to Arguments

2. Applicant's arguments filed 20 March 2009 have been fully considered but they are not persuasive.

On page 12 of the response the applicant argues that the claims as amended are not taught by the references because Ha et al. does not disclose that an area of the transmission region of the pixel is smaller than that of the reflection region and that "Kubota et al. discloses that a non color layer 10 and a counter electrode 6 are disposed in a region facing an electrode for transmissive display 3b so that light emitted from the light source passes through the non color layer 10, the counter electrode 6 and the

counter substrate 5 as recited in paragraphs [0087] to [0089]. But, the claimed invention discloses that a common electrode is formed on the portion of the color filter substrate corresponding to the transmission region so that light emitted from the backlight transmits the common electrode and the color filter substrate corresponding to the transmission region. Accordingly, Ha et al. in view of Kubota et al. fail to teach or suggest that the area of the transmission region of the pixel is smaller than that of the reflection region, and light emitted from the backlight transmits the common electrode and the color filter substrate corresponding to the transmission region as recited in the claimed invention." The examiner respectfully disagrees. While the examiner agrees that Ha et al. does not disclose that an area of the transmission region of the pixel is smaller than that of the reflection region, Ha et al. was not used to teach this feature, but rather as explained in the rejection below Kubota et al. teaches this feature. Further, while the examiner agrees that Kubota et al. does not disclose that a common electrode is formed on the portion of the color filter substrate corresponding to the transmission region so that light emitted from the backlight transmits the common electrode and the color filter substrate corresponding to the transmission region, Kubota et al. was not used to teach this feature, but rather as explained in the rejection below Ha et al. teaches this feature. Thus, the combination of Ha et al., Ozawa et al., Kubota et al. and Yamazaki and further in view of Kodama et al. teaches all of the limitations of the claims as amended.

Claim Objections

3. Claims 1, 8, 11, 24 and 25 are objected to because of the following informalities:

Claim 1 recites "wherein an area of the transmission region is smaller *that than* of the reflection region" which should be changed to recite "wherein an area of the transmission region is smaller *than that* of the reflection region."

Claims 1, 8, 11, 24 and 25 all recite "a common electrode formed on the *back* matrix..." which should recite "a common electrode formed on the *black* matrix..."

Claims 1, 8, 11, 24 and 25 also all recite "light emitted from the backlight *transmits* the common electrode and the color..." which is improper English.

Claim 8 also recites "A method of driving a trans-reflective liquid crystal display device...the method comprising the steps of" then recites "providing the pixels having..." and "providing a liquid crystal display panel...", "wherein the forming the liquid crystal display panel includes..."and "disposing a backlight...", which are not limitations pertaining to a method of driving, i.e. "providing" the device is not part of the method for driving it. It is clear that the applicant is intending to claim a method of driving and as such, the limitations in question should be changed to correspond with the method of driving.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-2, 5-7 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2003/0160920) in view of Ozawa et al. (US 2006/0152658) and further in view of Kubota et al. (US 2002/0171792) and Yamazaki (US 7,262,754).

Regarding claim 1, Ha et al. disclose a trans-reflective liquid crystal display device (Figure 8 and paragraph [0058]) comprising:

a plurality of data and gate lines defining a plurality of pixels (Figure 8 and paragraph [0059] explain that there are gate lines 104 and data lines 116), the pixels

having a reflection region and a transmission region (Paragraph [0060] explains that the pixels are divided into an transmissive region "E" and a reflective region "F".);

a liquid crystal display panel with a TFT array substrate and a color filter substrate and a liquid crystal layer interposed therebetween (Figure 1 shows color filter substrate 15 and the TFT array substrate 21, with liquid crystal layer 14 in-between and explained in paragraph [0010]), wherein the liquid crystal display panel includes:

a TFT formed on the TFT array substrate (Figure 9 and the last sentence of paragraph [0065] explains that the gate electrode 102, the source electrode 112 and the drain electrode 114 form a thin film transistor "T".);

an organic layer formed on the TFT array substrate including the TFT (Figure 9 and paragraph [0065] explain that there is a first passivation layer 118 formed on the substrate, where paragraph [0067] explains that it is organic.);

a transmission hole formed in the organic layer and having a slanted side profile (Figure 9 and paragraph [0065] explain that there is a transmissive hole 122 which has an inclined portion 122a, i.e. a slanted side profile.);

a reflection electrode formed on an upper surface of the organic layer including the slanted side of the transmission hole (Figure 9 and paragraphs [0068]-[0069] explains that reflector 126 is formed on the first passivation layer 118 including the slanted side.);

a passivation layer formed on the reflection electrode and the transmission hole (Figure 9 and paragraph [0068] explains that there is a second passivation layer 128 formed on the reflector 126 and the transmission hole.);

a pixel electrode formed on the passivation layer and connected to the TFT (Figure 9 and paragraph [0072] explains that a transparent electrode 136 is formed on the second passivation layer 128 and connected to the drain electrode 114 of the TFT.);

a black matrix formed on the color filter substrate (Figure 1 and paragraph [0012] explain that there is a black matrix the color filter substrate 15.);

color filter layers formed on portions of the color filter substrate corresponding to the reflection region (Figure 1 shows color filter layers 17), and

a common electrode formed on the black matrix, the color filters and a portion of the color filter substrate corresponding to the transmission region (Figure 1, element 13 and paragraph [0012])

a backlight (Figure 2 shows backlight 41), wherein the backlight is turned on in a transmission mode, wherein the light emitted from the backlight transmits the common electrode and the color filter substrate corresponding to the transmission region, and is turned off in a reflection mode (Paragraphs [0017]-[0019] explain that the backlight is on during transmissive mode and off during a reflection mode, where Figure 1 shows that the light from the backlight will transmit through the common electrode and the color filter substrate.), wherein the backlight is disposed under the TFT array substrate (Figure 2 shows that the backlight 41 is disposed under the substrate 21, and paragraph [0017]).

Ha et al. fails to explicitly teach:

a timing controller that receives, converts, and outputs image data;

a gate driver that receives a gate signal from the timing controller;

a data driver that receives a data signal from the timing controller; and

the liquid crystal display panel displaying the image according to a gate pulse and a data voltage applied by the gate driver and the data driver.

Ozawa et al. disclose a trans-reflective liquid crystal display device comprising

a timing controller that receives, converts, and outputs image data (Figure 21 and paragraphs [0193]-[0194] explain that timing generator 573 controls the display-data outputting source 570 and the display-data processing circuit 571 to output display data.);

a gate driver that receives a gate signal from the timing controller (Figure 12 shows a scanning driver circuit 157 as explained in paragraphs [0160] and [0195].);

a data driver that receives a data signal from the timing controller (Figure 12 shows a data driver circuit 158 as explained in paragraphs [0160] and [0195].); and

the liquid crystal display panel displaying the image according to a gate pulse and a data voltage applied by the gate driver and the data driver (Figure 13 and paragraphs [0160]-[0161] and [0169] explain that scanning and data drivers drive the scanning and data lines, which would be done by gate pulses and data voltages.).

Therefore, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the circuitry taught by Ozawa et al. in the trans-reflective liquid crystal display device taught by Ha et al. in order to allow for the display to be driven properly to display an image.

Ha et al. and Ozawa et al. fail to explicitly teach

wherein an area of the transmission region is smaller than that of the reflection region,

a switching unit that determines the output signal of the timing controller according to a transmission mode or reflection mode;

that the backlight is a sequential backlight including red, green, and blue lamps; and

a backlight controller connected to the sequential backlight to control the timing of light emissions in the transmission mode.

Kubota et al. disclose a trans-reflective liquid crystal display device comprising

wherein an area of the transmission region is smaller than that of the reflection region (Paragraph [0092])

a switching unit that determines an output signal according to a transmission mode or reflection mode (Paragraph [0089] explains that the backlight is turned off in reflective mode and turned on in transmission mode, which means that the display device is switched between the two mode, which inherently requires a switching unit in order to switched between the modes.)

a sequential backlight including red, green, and blue lamps (Paragraph [0089]), wherein the backlight is turned on in a transmission mode to sequentially transmit light into the transmission region (Paragraph [0089] explains that red, green and blue light is sequentially applied in the transmission mode.) and is turned off in a reflection mode (Paragraph [0088] explains that the display is driven in the reflective mode in the same

manner as prior art reflective liquid crystal display panels, meaning that the backlight is turned off during reflective mode. See paragraph [0005].); and

a backlight controller connected to the sequential backlight to control the timing of light emission in the transmission mode (Paragraph [0089] explains the timing is controlled to switch the three colors every 8 ms, which means that there is inherently a controller to control the timing.).

Therefore it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use a sequential backlight as taught by Kubota et al. with the trans-reflective display taught by the combination of Ha et al. and Ozawa et al. in order to obtain a liquid crystal display device capable of displaying excellent images with low power consumption, regardless of the brightness of the surrounding environments (See Kubota et al., paragraph [0029]).

Although Ha et al. and Ozawa et al. disclose of the backlight being disposed under the TFT array and Kubota et al. discloses of using an RGB sequential back, the combination of Ha et al., Ozawa et al. and Kubota et al. fail to explicitly teach of the RGB backlight disposed under the TFT array.

Yamazaki discloses of a liquid crystal display device in which an RGB backlight is disposed under the TFT array (Figures 1A and 3 and column 2, line 66 to column 3, line 13).

Therefore, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the teaching of Yamazaki in the liquid crystal display taught by the combination of Ha et al., Ozawa et al. and Kubota et al. such that

the RGB backlight is disposed under the TFT array in order to provide more uniform light distribution across the display as opposed to a side-lit panel.

Regarding claim 2, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the color filter substrate includes a color filter formed in the reflection region (Paragraphs [0028]-[0029]).

Regarding claim 5, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the lamp backlight includes a light emitting diode (Paragraph [0089]).

Regarding claim 6, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Ozawa et al. also disclose wherein the cell gap between in the transmission region is twice that in the reflection region (Figure 6B shows that the cell gap in the transmission region, represented by d, can be seen to be twice the size of the gap in the reflection region.).

Regarding claim 7, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Kubota et al. also disclose wherein the timing controller divides one frame of display data into three sub-frames (Paragraph [0089] explains that the backlight is switched every 8 mms dependent upon red, green and blue, meaning that there will be three sub-frames, one for each color.).

Regarding claim 25, this claim is rejected under the same rationale as claims 11 and 13-15.

7. Claims 4, 8, 11, 13-15, 19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. (US 2003/0160920) in view of Ozawa et al. (US 2006/0152658) and further in view of Kubota et al. (US 2002/0171792), Yamazaki (US 7,262,754) and Kodama et al. (US 6,642,916).

Regarding claim 4, Ha et al., Ozawa et al., Kubota et al. and Yamazaki disclose the trans-reflective liquid crystal display device of claim 1.

Ha et al., Ozawa et al., Kubota et al. and Yamazaki fail to explicitly teach wherein the data driver includes a MUX circuit shorting three adjacent data lines, the MUX circuit being turned on in the transmission mode and turned off in the reflection mode.

Kodama et al. discloses of a liquid crystal display device which includes a MUX circuit for shorting three adjacent data lines (Figure 5 shows that three adjacent data lines are shorted together, while Figure 6 shows that adjacent data lines are shorted together.).

Therefore, it would have been obvious to "one of ordinary skill" in the art at the time the invention was made to use the shorting circuit as taught by Kodama et al. in the trans-reflective liquid crystal display device taught by the combination of Ha et al., Ozawa et al., Kubota et al. and Yamazaki such that the shorting circuit will be turned on in the transmission mode and turned off in the reflection mode in order to allow for color images to be created by the sequential backlight in the transmission mode and by the color filter during the reflection mode.

Regarding claim 8, this claim is rejected under the same rationale as claim 4, where if the MUX circuit is OFF in the reflection mode, then inherently independent data voltages are applied to each pixel in the reflection mode.

Regarding claim 11, please refer to the rejection of claims 2 and 4, and furthermore Ozawa et al. also disclose a reflective electrode in the reflection region to reflect light incident from outside the liquid crystal panel (Figure 6B shows the reflecting electrode 4 as explained in paragraph [0118].).

Regarding claim 13, Ha et al., Ozawa et al., Kubota et al., Yamazaki and Kodama et al. disclose the liquid crystal display device of claim 11.

Ozawa et al. also disclose wherein the liquid crystal panel includes:

a second substrate (Figure 6B shows substrate 20.); and

a liquid crystal layer between the first and second substrate (Figure 6B shows a liquid crystal layer 50.).

Regarding claim 14, Ha et al., Ozawa et al., Kubota et al., Yamazaki and Kodama et al. disclose the liquid crystal display device of claim 11.

Ozawa et al. also disclose wherein the switching device includes a thin film transistor (Figure 18).

Regarding claim 15, this claim is rejected under the same rationale as claim 6.

Regarding claim 19, please refer to the rejection of claim 1.

Regarding claim 21, Ha et al., Ozawa et al., Kubota et al., Yamazaki and Kodama et al. disclose the trans-reflective liquid crystal display of claim 1.

Kubota et al. also disclose wherein the light from the backlight passes through the color filter substrate unfiltered (Paragraphs [0028]-[0029]).

Regarding claim 22, Ha et al., Ozawa et al., Kubota et al., Yamazaki and Kodama et al. disclose the method of claim 8.

Kubota et al. also disclose wherein the light from the backlight does not pass through a color layer (Paragraphs [0028]-[0029]).

Regarding claim 23, Ha et al., Ozawa et al., Kubota et al., Yamazaki and Kodama et al. disclose the liquid crystal display device of claim 11.

Kubota et al. also disclose wherein the color layer is only in the reflective region (Paragraphs [0028]-[0029]).

Regarding claim 24, this claim is rejected under the same rationale as claims 1-2 and 4.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN G. SHERMAN whose telephone number is (571)272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen G Sherman/
Examiner, Art Unit 2629

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629

14 April 2009